

REQUEST FOR RECONSIDERATION

Applicants thank Examiner Ahmed for the courtesies extended to Applicants' representative at the interview held on April 17, 2006. At that time, Applicants' representative discussed the differences between the regenerating process of the claimed invention and the disclosure of Yokomizo et al. (U.S. Patent No. 6,399,517). For instance, it was pointed out that the lengthy etching process in the reference, which requires the supply of a new etching liquid into a process bath, does not compare with the more simplified removal process of the present claims. It was also noted that the reference "teaches away" from the claimed invention, since the reference discloses that a more simplified process is not sufficient. (See column 7, lines 4-12 of the reference). The following further expands on the discussion with the Examiner.

Applicants remarks in the Response and Request for Reconsideration filed November 30, 2005 are incorporated herein by reference.

The rejection of claims 1-8 under 35 U.S.C. § 103(a) as obvious over Yokomizo et al. (U.S. Patent No. 6,399,517) is respectfully traversed in light of the following additional reasons.

The regeneration process according to the present invention is characterized with, *inter alia*, processing steps comprising "taking the etching solution out of the etch bath, said etching solution containing a silicon compound formed by the etching, and adding water to the taken-out etching solution to lower a concentration of phosphoric acid in the etching solution from 80 to 50 wt. %". These steps facilitate the precipitation of the silicon compound.

For instance, when a "used" etching solution containing a silicon compound was diluted 1.7-fold by weight with water, about 80% of the silicon compound contained in a non-diluted etching solution is formed to precipitate, as described in [0025] of the

specification. Thus, the only addition of procedures for adding water to the used etching solution, accelerating the precipitation of the silicon compound, to conventional processing steps, and subsequent to it, a conventional filtration step for removing the precipitated silicon compound lead to a regeneration process for the used etching solution, with the highly-enhanced removal of the silicon compound from the used etching solution. As such, the regeneration process according to the present invention does not cause a reduced etching rate, i.e., the etching solution becomes capable of being used continually. As a result, even in the continual use of the etching solution, a device can be treated stably and without any affects due to the continually-used etching solution.

The “adding water to the taken-out etching solution to lower a concentration of phosphoric acid in the etching solution” in the claimed invention is demonstrated in the following Table 1, as shown on page 30 of the present specification, which is commensurate in scope with the present claims.

Table 1

	Concentration of phosphoric acid in phosphoric acid solution ( unit: wt. % )	8 5 %	8 0 %	7 5 %	7 0 %
①	Concentration of silicon compound before filtration (in terms of Si) (unit: ppm)	60.1	56.5	53.0	49.5
②	Concentration of silicon compound after filtration (in terms of Si) (unit: ppm)	50.6	29.0	12.4	2.9
③	Reduced concentration of silicon compound by filtration (unit: ppm) (①－②)	9.5	27.5	40.6	46.6
④	Removing rate of silicon compound by filtration (unit: %) (①－②) ÷①×100	15.8	48.7	76.6	94.1

According to the present specification at page 28, paragraph [0051], explaining the contents of Table 1,

a phosphoric acid solution was diluted with water to predetermined various concentrations to determine any variations in the concentrations of the silicon compound in the diluted phosphoric acid solutions before and after filtration. The phosphoric acid solution provided . . . was a phosphoric acid solution which had been used in etching silicon nitride films, had a phosphoric acid concentration of 89% and contained the silicon compound dissolved at 63 mg/kg (hereinafter called 'the spent phosphoric acid'). Predetermined amounts of the spent phosphoric acid were placed in flasks, respectively, and were then diluted with distilled water to give phosphoric acid concentrations of 85% (comparative example), 80%, 75% and 70%.

Furthermore, the reduced concentration of the silicon compound by filtration and the removing rate of the silicon compound by filtration are calculated as shown in ③ and ④ of the above Table 1, respectively. (Applicants note that the calculation in ③ and ④ were added to the table for the Examiner's convenience). The table shows that 15.8%, 48.7%, 76.6% and 94.1% of the silicon compound contained in a phosphoric acid solution are precipitated by 85%, 80%, 75% and 70% dilution, respectively.

The Examiner's attention is directed to page 13, paragraph [0028] of the present specification which describes that

a concentration higher than 80% of phosphoric acid in the diluted etching solution leads to insufficient precipitation of the silicon compound from the etching solution and fails to exhibit the capturing removal effect of the silicon compound by filtration in a subsequent step. A concentration lower than 50% of phosphoric acid in the diluted etching solution, on the other hand, requires a great deal of water for dilution although the effect of promoting the precipitation of the silicon compound is not improved in proportion to the dilution.

In particular, as described in the present specification at page 30, paragraph [0052], "it is understood that the precipitation of the silicon compound contained in a phosphoric acid solution is promoted as the concentration of phosphoric acid in the phosphoric acid solution is lowered by dilution with water and hence, the concentration of the silicon compound differs substantially between before and after filtration." As also mentioned in paragraph

[0052], "[t]he present invention has been completed by paying attention to such a change in the saturated concentration of the silicon compound depending on a difference in the concentration of phosphoric acid."

In contrast, there is no such description or suggestion of the claimed concentration of the present invention whatsoever. Applicants note, as asserted by the Examiner, that the convoluted process and apparatus in Yokomizo et al. can involve the use of pure water. (See column 4, lines 18-27 of the reference). However, there is no indication of adjusting or lowering of the concentration to any specific level or that such an adjustment will advantageously promote precipitation in the etching solution, as demonstrated by the present invention.

Therefore, in view of above-stated reasons, the claimed invention is novel and unobvious in view of the reference.

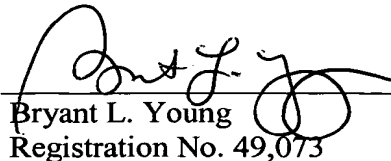
Accordingly, withdrawal of the rejection is requested.

Applicants submit that their application is now in condition for allowance. Early notification of such allowance is earnestly solicited.

Should the Examiner deem that any further action is necessary to place this application in even better form for allowance, the Examiner is encouraged to contact Applicants' undersigned representative at the below listed telephone number.

Respectfully submitted,

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